

**EPA Superfund  
Record of Decision Amendment:**

**MUNISPORT LANDFILL  
EPA ID: FLD084535442  
OU 01  
NORTH MIAMI, FL  
09/05/1997**

<IMG SRC 971870>

5 9 0001

RECORD OF DECISION  
AMENDMENT

MUNISPORT LANDFILL  
SUPERFUND SITE  
North Miami, Florida

<IMG SRC 97187A>

Prepared by:  
United States Environmental Protection Agency  
Region IV, Atlanta, GA

**DECLARATION  
RECORD OF DECISION AMENDMENT**

**SITE NAME AND LOCATION**

Munisport Landfill Site  
North Miami, Dade County, Florida

**STATEMENT OF BASIS AND PURPOSE**

This decision document represents an amendment to the Record of Decision (ROD) formerly issued by the United States Environmental Protection Agency on July 26, 1990. This amendment was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Contingency Plan (NCP). This decision is based on the administrative record for this site.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency throughout this project. In accordance with 40 CFR 300.430, FDEP, as the support agency, has provided input during the project. Based upon comments received from FDEP, it is expected that concurrence will be forthcoming; however, a formal letter of concurrence has not yet been received. Upon receipt, the State's concurrence letter will be placed in the Administrative Record for this site. The Metropolitan Dade County Department of Environmental Resources Management (DERM), as the local regulatory agency, has been consulted throughout this process as well. Based on DERM's comments, it does not object to EPA's determination to amend the ROD. A copy of DERM's comments regarding the amendment will be placed in the Administrative Record for this site.

The National Oceanic and Atmospheric Administration (NOAA) was also consulted in the development of the amendment. NOAA concurs with EPA's determination and a copy of their comments regarding this amendment will be placed in the Administrative Record for this site.

**DESCRIPTION OF THE AMENDMENT**

This amendment provides for no further remedial action under CERCLA.

**DECLARATION STATEMENT**

This amendment is protective of human health and the environment according to the requirements set forth in CERCLA, and requires no further response by EPA pursuant to said requirements. Actions to date have mitigated the significant threat to the environment posed by elevated ammonia levels and toxic conditions in the Mangrove Preserve as established in the ROD, such that further response by EPA is not necessary. Since this amendment relies on no engineering or institutional controls to prevent unacceptable risks, a five-year review of the protectiveness of the remedy is not needed. Finally, amendment of this ROD to no further remedial action constitutes completion of construction of all Superfund-related activities. Therefore, this site now qualifies for the inclusion on the Construction Completion List.

This amendment is separate from, and does not preclude, any actions the State of Florida and/or Metropolitan Dade County may deem appropriate for the site.

<IMG SRC 97187B>

**RECORD OF DECISION AMENDMENT  
DECISION SUMMARY**

MUNISPORT LANDFILL SITE  
NORTH MIAMI, DADE COUNTY, FLORIDA

Prepared by:  
United States Environmental Protection Agency  
Region IV, Atlanta, GA

**Table of Contents**

Section	Page No.
1.0 Introduction	1
2.0 Site Background	1
3.0 Community Participation	6
4.0 Scope and Role of Response Action	7
5.0 Site Characteristics	8
5.1 Causeway Breach	8
5.2 Service Road	11
5.3 Hydraulic Barrier System	11
6.0 Summary of Site Risks	13
6.1 Study Approach	15
6.1.1 Sample Locations	15
6.1.2 Tidal Assessment	18
6.1.3 Water Quality Assessment	18
6.1.4 Toxicity Assessment	22
6.2 Study Approach	22
6.2.1 Tidal Assessment	22
6.2.2 Water Quality Assessment	23
6.2.3 Toxicity Assessment	27
6.3 Conclusions	27
7.0 Description of No Action Alternative	29
8.0 Explanation of Significant Changes	30

**Figures**

Figure No.	Description	Page No.
2-1	Site Location Map	2
2-2	Evolution of Information and Key Decisions	5
5-1	Remedial Action- Phase I Causeway Breach	9
5-2	Surface Water Quality Sampling Locations	10
5-3	Toxicity and Ammonia Correlation	12
5-4	Hydraulic Barrier Layout and Location of Verification Test	14
6-1	Study Area Location Map	16
6-2	1996 Mangrove Sample Locations	17
6-3	Dania Canal reference Site	19
6-4	Biscayne Creek reference Site	20
6-5	Black Point reference Site	21

## Tables

Table No.	Description	Page No.
6-1	Initial Field Screening	24
6-2	Comparison of Total Ammonia Concentrations to Ambient Water Quality	25
6-3	Comparison of Organic and Inorganic Concentrations in August 1996 to Ambient Water Quality Criteria	26
6-4	Summary of the Results of Toxicity Tests Performed on Munisport Water Quality Samples, August 1996	28

## Appendices

Description	Appendix No.
Responsiveness Summary	1

## 1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the Munisport Landfill Superfund Site on July 26, 1990, to address the significant threat posed to the environment. This threat was documented by EPA in 1989, after the investigation of the water quality and toxic conditions of a wetland adjacent to the landfill. This wetland is comprised of a mangrove swamp that is part of the State of Florida Biscayne Bay Aquatic Preserve, consequently known as the Mangrove Preserve ("Preserve"). The ROD provided for the interception of the flow of leachate-contaminated groundwater from the landfill to the Mangrove Preserve to reduce the risks posed to aquatic organisms in the Preserve due to elevated levels of ammonia. Through this remedy EPA intended to achieve the necessary degree of environmental protection set forth in CERCLA. Results from the Remedial Investigation and Baseline Risk Assessment conducted by EPA in 1988 documented no significant risks to human health. Therefore, protection of human health was not a component of the ROD. Closure of the landfill and management of storm water runoff was not part of this ROD and was to be addressed independently via State Landfill Closure established in Section 62-701 of the Florida Administrative Code.

Although this amendment supersedes the remedy originally established for this site, it will not provide a detailed discussion of historical and technical information formerly presented in the ROD. The ROD and other documents included in the Administrative Record for this site will still be the proper source regarding such information.

## 2.0 SITE BACKGROUND

The Munisport Landfill is a former municipal landfill, 170 acres in size, located within the City of North Miami, Dade County, Florida. As shown in Figure 2-1, the landfill is bordered to the west by a United States Post Office and a large multi-department retail store along Biscayne Boulevard; to the north by 151st Street; to the east by hydraulically altered wetlands and the Mangrove Preserve; and to the south by Highland Village, a residential community.

The landfill is part of a 291-acre parcel of land that was formerly planned as part of a trade and cultural, and later, a recreational center. The tract of land can be divided into the four following areas: 170-acre landfill; 15-acre upland; 93-acre hydrologically altered wetland; and 13-acre wetland adjacent to Biscayne Bay. In addition to the 291-acre parcel, the State Mangrove Preserve is comprised of an approximately 130-acre mangrove forest located east of the landfill and altered wetlands.

Filling of low-lying areas with clean fill and construction debris began in 1974. As described in a detailed history of the site in the ROD and Remedial Investigation Report (1988), Munisport Inc., the City of North Miami, and ABC Demolition were involved in various enforcement activities regarding the permitting of the landfill. A temporary operating permit was eventually issued by the Florida Department of Pollution Control (now known as the Florida Department of Environmental Protection) in 1976. The U.S. Army Corps of Engineers also issued earlier in 1976 a dredge and fill permit pursuant to Section 404 of the Clean Water Act (CWA) to allow the filling of "waters of the U.S." with clean fill.

<IMG SRC 97187C>

EPA became involved with the site in 1980 in opposition to a request by Munisport, Inc., to the Corps of Engineers to modify the dredge and fill permit to allow the use of garbage in the filling of the wetlands. EPA formally issued a veto pursuant to Section 404(c) of the CWA to prevent the use of garbage to fill the wetlands. Landfill activities subsequently ceased in 1981. To date, however, the landfill has not been properly closed in accordance with FAC 17-101.

In 1982, EPA evaluated the landfill for inclusion on the National Priorities List (NPL). The site was added to the NPL in 1983, primarily due to the potential threat to nearby municipal wells. These wells were subsequently taken out of service due to saltwater intrusion. As a result, the City of North Miami petitioned EPA to remove the site from the NPL. Consistent with EPA's policy of not rescoring sites that had been finalized on the NPL, EPA did not delete the site and decided to conduct an RI to evaluate potential risks to human health and the environment.

EPA completed an RI of the site in 1988 that documented no threat to human health; however, the threat to the environment was inconclusive. Because of the threat to the environment appeared marginal, EPA proposed an action in July 1988 that included closure of the landfill in accordance with State law. After review of public comments on the proposed plan, EPA reevaluated the threat to the environment, and issued a second plan in November 1988 that provided for no action. The proposal for no action was opposed by local environmental and citizen groups, the National Oceanic and Atmospheric Administration (NOAA), and U.S. Fish and Wildlife Service. In response, EPA conducted a second study in 1989, that further evaluated the threat to the environment.

Results from the second study, the Water Quality and Toxic Assessment Study, Mangrove Preserve, (1989), documented elevated levels of ammonia in the Preserve and toxicity among laboratory organisms exposed to Mangrove Preserve surface water. EPA interpreted these results as posing a significant threat to the environment. Although elevated levels of ammonia were believed to represent the primary contaminant of concern, other potential causes of the toxicity could not be estimated at this time. Among other findings, EPA also concluded that culverts tidally connecting the Preserve with Biscayne Bay were undersized, restricting the maximum tidal exchange by as much as 40 percent. The report also concluded that improved tidal circulation would help to mitigate the environmental threat, but may not be adequate to fully achieve the desired degree of environmental protection.

In absence of data to demonstrate that the observed toxicity in the Mangrove Preserve could have been mitigated through increased tidal circulation, EPA selected a remedy in 1990 that provided for the construction of a hydrologic barrier to prevent the discharge of leachate-contaminated groundwater from the landfill to the Mangrove Preserve. The remedy also provided for the treatment of the collected contaminated groundwater through air stripping. Treatment of the contaminated groundwater was necessary for disposal purposes, but it was not the intent of the ROD to clean up the groundwater at the landfill, because the Risk Assessment had demonstrated that groundwater quality did not pose an unacceptable risk to public health. As discussed in the RI and ROD, the groundwater underlying the site was no longer suitable for drinking water due to saltwater intrusion. Had EPA not believed that a hydraulic barrier was needed to protect the aquatic life in the Mangrove Preserve, pumping and treating of the groundwater would not have been necessary pursuant to the requirements of CERCLA. EPA's selected remedy also included the tidal restoration of the Mangrove Preserve and hydrologically-altered wetlands.

EPA entered into a Consent Decree in 1992, with the city of North Miami to implement the remedy set forth in the ROD. As part of the initial phases of the remedial design, additional data were collected regarding the site-specific hydrologic conditions. The results from this study are documented in a report titled Remedial Design Studies Report, Blasland, Bouck & Lee, 1994. EPA also conducted a treatability study to verify the effectiveness of the selected treatment alternative. Based on results from the treatability studies, EPA determined that air stripping was not as effective as originally believed and subsequently issued an Explanation of Significant Differences in 1994 changing the treatment and disposal alternative to off-site treatment and disposal at the North Dade Wastewater Treatment Plant. The treatability studies also documented that elevated levels of un-ionized ammonia, not other "unknown" toxicants, were the cause of the

toxicity. Results from the treatability studies are documented in the following reports: Pilot Study: Munisport Leachate Treatability, USEPA, Environmental Services Division, November 5, 1992; Toxicity Testing of Three Wellwater Samples, Munisport CERCLA Site, USEPA, Environmental Services Division, June 4, 1995; Toxicity Characterization of Groundwater Samples, TRAC Laboratories, June 9, 1993; Bioremediation Treatability Verification Status Report, SECOR, September 1996, and can be found in the Administrative Record for the site.

Due to the varying degrees of complexity in scope of the different components of the remedy, EPA decided to segment the design and construction process into the four following phases: Causeway Breach, Service Road, Hydraulic Barrier, and Treatment and Disposal. Construction of the causeway breaches was straightforward and was completed in September 1995. Associated with the causeway breaches was monitoring of the surface water quality in Biscayne Bay and the Preserve before and after the construction of the causeway breaches. Construction of the service road and recovery wells for the hydraulic barrier were substantively completed in 1996. A draft preliminary design for the groundwater treatment and disposal system was submitted to EPA for review and comment in December 1996. Peer review comments were solicited on the draft design; however, due to the results of the surface water monitoring, EPA decided not to continue with additional design work on the groundwater treatment system pending a final decision by the Agency regarding the effect of the tidal restoration of the Mangrove Preserve.

A timeline of key information gathered regarding the Munisport Landfill dating back to the mid-1970's, and associated key decisions, is provided in Figure 2-2.

<IMG SRC 97187D>

### **3.0 COMMUNITY PARTICIPATION**

The Munisport Landfill Superfund project has involved extensive community participation dating back to the early 1980's. Over the years various community-based organizations such as homeowner associations and activist groups, as well as, local chapters of national environmental organizations have commented on various aspects of the project. Section 5.0 of the ROD describes in detail community participation through the issuance of the ROD in 1990.

After the release of the ROD, EPA continued to involve the community in the remedial process. The community's main group is the Munisport Dump Coalition (MDC), the recipient of a Technical Assistance Grant (TAG) from EPA. Through the MDC, the community has had an opportunity to comment on documents required by the National Contingency Plan (NCP), and other documents relating to the design and construction of components of the remedy set forth in the ROD. In an effort to encourage community participation throughout the process, EPA has issued several deviations from the original \$50,000 grant, bringing the total funding for the TAG to \$150,000.

In addition to the coordination with the MDC, EPA has also worked with representatives of local groups such as the Friends of the Oleta River, Keystone Point Homeowners Association, Highland Village Homeowners Association, Florida and Tropical Audubon Societies, and Concerned Citizens for the Public use of Munisport. EPA has also held numerous public and technical meetings and issued numerous fact sheets to keep the community apprised of the progress and to solicit input during the design and construction process.

The community has also been involved in this project through the Consent Decree entered by the United States District Court in 1992. Although the only parties to the Consent Decree are the United States of America and the City of North Miami, the District Court has allowed interested non-parties in the community to file information and express concerns with regard to the implementation of the remedy set forth in the ROD.



With regard to community participation for this amendment to the ROD, EPA issued a proposed Plan and public notice on May 13, 1997, announcing a 30-day public comment period and a public meeting. Concurrent with the release of the Proposed Plan, the Administrative Record was amended to include documents used in the development of the proposed amendment to the ROD. Shortly after the release of the Proposed Plan, the Administrative Record extension to the public comment period. These requests were granted and the comment period formally extended through July 13, 1997.

As a part of EPA's community involvement efforts, a public meeting was held locally from 7:00 p.m. until 10:30 p.m. on June 5, 1997. This meeting was attended by approximately 50 people from the community. While EPA used a local community paper with a circulation of about 80,000 for notification purposes, the City of North Miami also published a separate notification in the Miami Herald to fulfill its own notification requirements. EPA also notified a reporter for the Miami Herald that published a story on the site with an announcement of the public comment period and public meeting date. Finally, EPA mailed copies of the Proposed Plan to approximately 150 members of the community that had previously expressed interest in the site.

Some members of the community expressed concern that EPA had not advertized the meeting and public comment period in a local paper of major circulation. In response to concerns of some community members and the Agency's desire to ensure that everyone in the community interested in the site had an opportunity to comment on the plan, a second notification of the public comment period was issued. The second notification was published in the Neighbor's section of the Miami Herald on June 15, 1997. The notification also announced additional meetings. In response to requests from members of the community for a longer public meeting, EPA arranged an informal public availability session from 12:00 p.m. until 4:00 p.m. and a second public meeting from 6:00 p.m. until 9:00 p.m. on June 23, 1997. In contrast to the first public meeting, the availability session and second public meeting was attended by less than ten people from the public.

As a result of the public comment period, EPA received comments from individual members of the community, a homeowners association, two municipality, and a community activist group. Although no comments were received from federal, state, or county officials on the proposed plan, these agency's did provide comments on the draft ROD Amendment as part of the peer review process. Although some of the comments; supported EPA's proposed action, many of the comments from the community expressed concern regarding EPA's proposed action. Some of the comments were of a technical nature regarding the effects of the tidal restoration of the Mangrove Preserve and the results from the study to reassess the water quality and toxic conditions after the tidal restoration. Other comments were of a policy nature and dealt with concerns for the future of the project should EPA amend the ROD to no action and refer the project to the State and County for final action. Many of the comments were also beyond the scope of this amendment and raised questions regarding the adequacy of prior studies and the ROD. Though many of the comments were highly critical of EPA's management of this project, most of the commenters desired that EPA stay involved in the project to retain federal oversight of the project by the United States District Court and to provide a direct mechanism for community involvement in the cleanup process pursuant to the requirements of CERCLA and the NCP. A detailed summary of the comments and EPA's response to the comments are provided in the Responsiveness Summary, Appendix A of this Amendment. The actual comments and transcripts from public meetings are included in the Responsiveness Summary.

#### **4.0 SCOPE AND ROLE OF RESPONSE ACTION**

Based on results of the reassessment of the water quality and toxic conditions in the Mangrove Preserve in 1996, EPA has determined that the increased tidal circulation of the Mangrove Preserve has significantly improved the surface water quality through dilution, increased

dissolved oxygen, and increased nitrification of the ammonia. EPA has, therefore, determined that the surface water toxicity documented in 1989 has been mitigated. Thus, EPA believes that no further response under Superfund is warranted. EPA recognizes that implementation of the tidal restoration only affected surface water conditions in the Preserve and has likely had little effect on the quality of groundwater underlying the landfill. However, the remedy selected in the 1990 ROD was to address the environmental threat, not restoration of the groundwater nor landfill closure.

Remaining groundwater contamination and landfill closure will be addressed independently of Superfund, pursuant to State and County regulations. Tidal restoration of the altered wetlands will be addressed pursuant to the Clean Water Act through an Administrative Order with EPA.

## **5.0 SITE CHARACTERISTICS**

A detailed discussion of the site characteristics are provided in Section 6.0 of the ROD. In general, the Munisport Landfill remains in the same condition as described in 1990. Some modifications to the landfill have occurred, however, as a result of the Superfund-related construction activities. Changes in site conditions from those formerly discussed on the ROD are presented in the following.

### **5.1 CAUSEWAY BREACH**

As previously discussed, because of the varying degrees of complexity in the scope of the design and construction of the remedy, EPA separated the design and construction of the causeway breach and tidal restoration of the Mangrove Preserve from the design and construction of the other Superfund components. The tidal flow to the Mangrove Preserve was reestablished through the removal of two 66-inch diameter culverts and the construction of two 40-foot wide breaches in the 135th street causeway extension. The construction also involved the rerouting of a 30-inch diameter water main along the causeway. Pedestrian access was maintained along the causeway through the installation of a six and one-half foot wide concrete bridge at each causeway breach. The location of the causeway breaches are shown in Figure 5-1. A detailed summary of the work performed is contained in the remedial action report titled Remedial Action Report, Phase I - Causeway Breach, Munisport Landfill Superfund Site, North Miami, Florida, September 4, 1995.

Due to concerns of members of the community and local regulatory agencies regarding the potential discharge of contaminants from the Mangrove Preserve to Biscayne Bay as a result of the increased tidal circulation, a surface water monitoring program was incorporated into the project. The monitoring included the collection of surface water samples from the Preserve and Biscayne Bay prior to and after the construction of the causeway breaches. Analytical parameters included ammonia and priority pollutants. Locations for the surface water monitoring stations are shown in Figure 5-2.

Prior to the causeway breach, results from surface water monitoring did not indicate significantly elevated levels of ammonia nor priority pollutants at stations in Biscayne Bay. Ammonia concentrations were elevated in the Mangrove Preserve as formerly documented during the 1989 baseline study. After the tidal restoration of the Mangrove Preserve, results from the surface water monitoring indicated a dramatic decrease in the concentration of ammonia in comparison with levels in 1989. Figure 5-3 provides a correlation of ammonia vs. toxicity results from the 1989 study with ammonia levels detected at the two monitoring stations in the Mangrove Preserve sampled after the tidal restoration. A comparison of the ammonia levels detected after the causeway breach with toxicity results from the 1989 study suggested that there may have been a reduction in toxicity as well. This prompted EPA to conduct an in-depth reassessment of the changes in water quality and toxicity that may have resulted from the tidal

restoration. The post- breach monitoring also showed no significant increase in ammonia in samples collected from Biscayne Bay. A summary of the results may be reviewed in a document titled (add citation).

<IMG SRC 97187E>

<IMG SRC 97187F>

## 5.2 Service Road

Portions of the remedy in support of the hydraulic barrier have been completed. This includes construction of approximately 4000 feet of service road along the southwestern, southern, and eastern perimeters of the landfill. This road was intended to provide access for the construction, operation, maintenance of the hydraulic barrier system. Construction of the Service Road began in June 1995 and was substantively completed in May 1996. In connection with the construction of the road, approximately 1.4 acres of wetlands were impacted along the eastern landfill perimeter. Impacts to these wetlands were mitigated pursuant to the requirements of the CWA, resulting in the construction of a 2.4 acre wetland formerly filled with construction debris. A detailed summary of the work performed is contained in the remedial action report titled Munisport Landfill Superfund Service Road, Final Remedial Action Report No. 2, Munisport Landfill Superfund Site, SECOR International, Inc., September 1996.

## 5.3 Hydraulic Barrier System

As set forth in the ROD, the remedy included the installation of a hydraulic barrier system to intercept the flow of leachate contaminated groundwater from the landfill prior to its discharge to the Mangrove Preserve. A southern component of the hydraulic barrier system was subsequently added based on recommendations from technical advisors for the Munisport Dump Coalition due to concerns for potential flow of leachate contaminated groundwater from the landfill southward to the Arch Creek Canal. Due to variations in hydrogeology and proximity to surface water, a horizontal recovery well system was selected for the eastern landfill perimeter, while a conventional vertical recovery well system was selected for the southern perimeter. Installation of the recovery wells began in January 1996.

The southern vertical well recovery system construction included the installation of 15 recovery wells. The wells were 4-inches diameter, and installed to an approximate depth of (-) 20.00 feet National Geodetic Vertical Datum (NGVD). The vertical wells were installed approximately 100 feet apart along the southern access road. Each well was designed for an optimal pumping rate of 12 to 15 gallons per minute (GPM).

<IMG SRC 97187G>

Installation of the horizontal recovery well system included the installation of 14 300-foot segments along the eastern landfill perimeter. The wells were constructed of 8-inch diameter flexible perforated pipe. Each 300-foot segment was capped at each end and had three well risers for installation of pumps and future access for maintenance of the well. Each well was designed for an optimal pumping rate of 55 GPM. The depth of the horizontal recovery well averaged (-)10-feet NGVD and was designed to capture the freshwater lens in the aquifer prior to discharge to the Mangrove Preserve, without adversely affecting the saltwater interface. This recovery depth is also consistent with the greatest mass of ammonia being concentrated in the upper freshwater portion of the aquifer.

Construction of the recovery wells was completed in July 1996. Figure 5-4 denotes the location of the finished wells. A detailed summary of the work performed is contained in the remedial action report titled Munisport Landfill Superfund Site, Hydraulic Barrier, Recovery Well &

## 6.0 SUMMARY OF SITE RISKS

Potential risks to human health and the environment associated with the Munisport Landfill were evaluated as part of the Final Remedial Investigation Report, Munisport Landfill Site, Remedial Investigation, North Miami, Florida (1988) and Water Quality and Toxic Assessment Study, Mangrove Preserve (1989). As discussed in these documents and summarized in Section 7.0 of the ROD, there was no potential for unacceptable risks to human health related to releases of contaminants from the Munisport Landfill documented using conventional exposure scenarios. However, results from the baseline assessment of the water quality and toxic conditions of the State Mangrove Preserve did document significant toxicity and adverse effects to the aquatic organisms in the surface water. The environmental threat to aquatic organisms in the Mangrove Preserve was the basis for the remedy selected in the ROD. As discussed in the 1989 report, the threat to the environment was based on the documentation of unacceptable levels of toxicity (e.g., greater than 80% mortality) of aquatic organisms exposed to surface water from the Mangrove Preserve.

As discussed in Section 5.1, changes in water quality in the Mangrove Preserve after the tidal restoration with Biscayne Bay prompted EPA to reassess the water quality and toxic conditions of the Mangrove Preserve. Based on the results from the post-breach surface water monitoring, EPA believed that there may have been a corresponding reduction in toxicity in the Preserve. EPA, therefore, designed a study that incorporated critical elements of the 1989 study, but was refined and more focused than the 1989 study using information collected during the remedial design studies and treatability studies. For example, one component of the 1989 baseline study that assessed potential toxicity to the common Atlantic Sea Urchin, *Arbacia punctulata*, was not conducted because no toxicity was observed in 1989.

<IMG SRC 97187H>

Moreover, EPA believes that results from remedial design and treatability studies resolved the questions from the 1989 baseline study as to whether or not ammonia was the main cause of the toxicity. Concerns had been expressed by EPA, other agencies, and members of the community that not all of the toxicity documented in 1989 may have been the result of elevated levels of ammonia and that some of the toxicity may be associated with elevated levels of metals, organic compounds, or other toxicants. However, as discussed below, EPA believes that data collected during the design and treatability study demonstrate that the toxicity documented in the 1989 study was the result of elevated levels of ammonia, potentially compounded by low levels of dissolved oxygen in the water.

EPA developed a collaborative approach that involved personnel from EPA, the Florida Department of Environmental Protection (FDEP), Metro-Dade Department of Environmental Resource Protection (DERM), NOAA and EPA's contractor, Bechtel Environmental. Bechtel was tasked to prepare the planning documents, provide logistical support, lead in the field investigation, and prepare a report of the study findings. Bechtel subcontracted with ICF Kaiser Engineers to obtain assistance for the evaluation of potential environmental risks. Due to the large sampling area and number of samples to be collected at the same tidal interval, FDEP, DERM, and NOAA provided additional field personnel. DERM also provided logistical assistance in the form of boats to access sampling stations in the bay. Water quality analyses and toxicity testing support was provided by EPA.

The scope of the study and results are summarized below. A detailed discussion of study approach and results may be reviewed in the Field Operations Plan or a Wetland Water Quality and Toxicity

Assessment, Munisport Landfill, Bechtel Environmental, 1996, and Water Quality and Toxicity Reassessment Study, Mangrove Preserve, Munisport Landfill, Bechtel Environmental, Inc., in consultation with ICF Kaiser Engineers, Inc., 1997, respectively, which can be found in the Administrative Record for this Site.

## 6.1 Study Approach

As discussed previously, the study was patterned after the 1989 baseline study. It incorporated a tidal assessment, water quality assessment, and toxicity assessment. As shown in Figure 6-1, the study incorporated an area that ranged from Dainia Canal, approximately 11 miles north of the Mangrove Preserve, to Black Point approximately 24 miles south of the Preserve. The main focus of the sampling, however, was in the Mangrove Preserve area

### 6.1.1 Sample Locations

Sampling locations in the Mangrove Preserve area included the 11 stations originally sampled during the 1989 study, along with two new stations at the east and west causeway breaches. Sampling locations in the area of the Mangrove Preserve are shown in Figure 6,2. Samples were initially collected from each of these stations and screened in the field for the presence of ammonia and other water quality parameters. Based on results from the field screening and using results from the study, four stations (i.e., D4, D5F, D6 (Mangrove Preserve) and ECC (east causeway breach) were selected for collection of samples for further water quality and toxicity testing. These stations reflected a range of locations with high and low ammonia levels throughout the Preserve.

<IMG SRC 97187I>

<IMG SRC 97187J>

Samples were also collected from three original sites located at Dania Cutoff Canal, Biscayne Creek, and Black Point. Locations for the reference stations are shown in Figures 6-3, 6-4, and 6-5. In addition to the Preserve and reference locations, samples were also collected from the confluence of the east and west causeway breaches (Figure 6-2), and the wetland mitigation area (Figure 6-2).

### 6.1.2 Tidal Assessment

The 1996 tidal assessment conducted in 1989 was repeated during the 1996 study. Periods of high and low tide in the preserve and tidal water volume exchange between the Mangrove Preserve and Biscayne Bay were assessed. Tidal stages were determined by measuring surface water elevations at the east and west causeway breaches and the inland most station, D6, in the Mangrove Preserve. Three submersible trolls (i.e., combined pressure transducer/electronic data logger) were installed at each location and continuously operated for up to five days, collecting data at ten minute intervals.

Tidal water volume between the Mangrove Preserve and Biscayne Bay was determined from surface water measurements, surveyed channel cross-sections, and velocity profiles to the east and west channels. Channel geometry was obtained from manual measurements of discrete intervals of the channels. Velocity profile measurements were collected at the east and west causeway breaches at two hour intervals, for a 12-hour period.

### 6.1.3 Water Quality Assessment

The water quality assessment was comprised of both point and diel measurements of ammonia, pH, dissolved oxygen, temperature, and salinity at all of the surface water sampling locations

described in Section 6.1.1 at both high and low tide. Measurements were made in the field using a Hydrolab water quality monitor. Additional water quality samples collected in March 1997, were measured using YSI Model 85 water quality analyzer and an Oakton pH tester.

Point measurements of water quality parameters were collected during initial screening of the 1989 study locations. This data was used to select four stations for the collection of samples for the 1996 chronic toxicity testing. Samples were also collected from these stations for water quality analyses to aid in the interpretation of the toxicity data. Water quality parameters were measured and chemical analysis included ammonia, purgable and extractable organic compounds, pesticides/polychlorinated byphenyls (PCBs), and inorganic constituents. Chemical analyses were conducted by EPA contract laboratories.

<IMG SRC 97187K>

<IMG SRC 97187L>

<IMG SRC 97187M>

#### 6.1.4 Toxicity Assessment

Surface water samples were collected from the three stations in the Mangrove Preserve (i.e., D4, D5F,D6), the east causeway breach (ECC), wetland mitigation area (WMA), confluence with Biscayne Bay (CBB), and the three reference sites (i.e., DC, BC, BP). Samples were collected at high and low tide. Toxicity tests were conducted using a coastal minnow, *Menidia beryllina*, and a single cell algal species, *Minutocellus polymorphus*. Supplemental samples were collected at stations D4, D5F, and D6, during 48-hour and 96-hour intervals for continued chronic toxicity testing. Toxicity testing was conducted by EPA.

#### 6.2 Study Results

Results from the reassessment of the water quality and toxicity conditions of the Mangrove Preserve show that the tidal restoration has significantly improved the tidal exchange between the Preserve and Biscayne Bay. The data also show a significant reduction in the levels of ammonia and toxicity formerly documented in the 1989 study. The results of the tidal, water quality, and toxicity assessment are discussed below.

##### 6.2.1 Tidal Assessment

Former flood volumes at the historical culvert locations were calculated using velocity and flow area data obtained from the 1989 study. Discharges at different times were computed by multiplying velocity and flow area data, and the discharge versus time curve was integrated for the duration of the flood tide to yield the flood volumes into the Mangrove Preserve. The flood volumes calculated for the east and west culverts were estimated at 29.7 and 27.5 acre-feet, respectively.

Tidal flow volumes at the causeway breaches were calculated by measuring the cross sectional area of the channels, and measuring the velocities of the water in the channels at various depths. Average velocities were multiplied by the cross-sectional areas for which they were considered representative, and the resulting quantities added together to yield the total discharge for the tidal interval evaluated. The discharge versus time curves were integrated for the duration of the flood and ebb tides to yield, respectively, flood and ebb volumes. Flood and ebb volumes estimated for the east causeway breach were 34.4 and 31 acre-feet, respectively. Flood and ebb volumes estimated for the west causeway breach were 39.7 and 37.0 acre-feet, respectively.

Based on an comparison of flood volumes before and after the causeway breaches, it is estimated

that the tidal flow into the Mangrove Preserve through the east culvert increased by approximately 16 percent, with a tidal range of about 2.5 feet. In fact, tidal flow to the Preserve through the west culvert increased by approximately 44 percent. This is consistent with the 1989 estimated restriction of tidal flow to the Preserve of 42 percent. Based on the predictions made in 1989, substantiated by this study, the removal of the two 66-inch diameter culverts and construction of open flow channels significantly increased the tidal exchange with Biscayne Bay.

#### 6.2.2 Water Quality Assessment

During the August 1996 study, ammonia concentrations were measured in the field, in the laboratory by EPA, and its contract laboratory. Surface water samples collected in March 1997, were analyzed by an off-site laboratory. A summary of the field screening measurements are provided in Table 6-1. Analytical results in the laboratory are summarized in Table 6-2. A comparison of these results to the ambient water quality criteria is also provided in the table.

Overall, ammonia concentrations measured during the 1996 and 1997 sampling events were significantly lower than concentrations reported in 1989. Ammonia concentrations detected among the ten samples collected in the Preserve in 1996 ranged from 0.06 mg/l to 3.9 mg/l. In contrast, ammonia levels in 1989 ranged from 1 mg/l to 15 mg/l in samples collected for water quality analyses. Analyses of samples collected for toxicity tests in 1989 indicate a broader range for ammonia concentrations, ranging from 0.023 mg/l to 25.24 mg/l. As illustrated in Table 6-2, both sets of analytical data for the sampling stations in 1996 indicate that total ammonia concentrations are below chronic AWQC in the Mangrove Preserve. Thus, the potential for adverse effects to aquatic organisms is unlikely, which is further substantiated by the absence of toxicity as discussed below.

Due to concerns that the increased rainfall during the 1996 event may have diluted the potential discharged of ammonia, additional sampling was conducted during a dry period in 1997 of four stations in the Mangrove Preserve. Since the goal of the sampling was only to assess whether or not there may be more concentrated discharges of ammonia during dry periods, the samples were analyzed for ammonia only. The results demonstrated no significant difference in the discharge of ammonia during dry or wet periods. The ammonia levels were still well below levels reported in 1989, but slightly elevated above the 1996 results. Total ammonia concentrations reported in 1997 ranged from 0.44 mg/l to 4.8 mg/l. Consistent with the previous sampling events, station D6, the inland most station, still had the highest level of ammonia. The ammonia level for this station also exceeded the AWQC, but due to the consistency with the 1996 results, and significantly lower level than observed in 1989, is not expected to pose any significant health effects to aquatic organisms.

Diel measurements indicated that within the Mangrove Preserve, ammonia concentrations have been reduced most likely as a result of increased tidal flushing of the Preserve and/or decreased ammonia discharges from the landfill, as suggested by a general decrease in ammonia levels in the groundwater from those formerly in the 1988 RI. Diel measurements are contained in Appendix C of the Water Quality and Toxicity Reassessment Study, Mangrove Preserve, Munisport Landfill, Bechtel Environmental, Inc., in consultation with ICF Kaiser Engineers, Inc., 1997, and can be found in the Administrative Record for this Site.

**TABLE 6-1**  
**INITIAL FIELD SCREENING**  
**MUNISPORT SITE**

LOCATION a	DATE	TEMP (C)	pH	SALINITY (ppt)	AMMONIA SCREEN (mg/L)
High Tide					
D1.5	16-Aug	28.94	7.24	30.8	0.74
D2	16-Aug	29.47	7.18	30.2	0.66
D3G	16-Aug	28.63	7.26	32.7	0.82
D4	16-Aug	28.90	7.30	24.4	0.79
D4D	16-Aug	28.78	7.28	9.9	0.58
D5C	16-Aug	28.63	7.29	27.6	0.79
D5F	16-Aug	28.74	7.40	31.5	1.13
D6	16-Aug	27.89	6.79	31.6	0.25
D7B	16-Aug	29.19	7.17	31.7	0.69
D7.5	16-Aug	28.68	7.19	31.4	0.72
D10	16-Aug	29.20	6.98	30.5	0.48
WCC	16-Aug	29.69	7.16	9.6	0.45
ECC	16-Aug	30.33	7.46	9.9	0.87
Low Tide					
D1.5	17-Aug	27.81	7.21	23.3	0.61
D2	17-Aug	28.90	7.18	30.9	0.67
D3G	17-Aug	27.51	7.25	9.4	0.52
D4	17-Aug	27.39	7.37	9.9	0.62
D4D	17-Aug	27.42	7.40	26.3	0.96
D5C	17-Aug	27.18	7.43	22.8	0.93
D5F	17-Aug	27.20	7.21	30.7	0.65
D6	17-Aug	27.81	6.78	32.1	0.16
D7B	17-Aug	27.14	7.21	12.1	0.53
D7.5	17-Aug	27.04	7.29	31.0	0.87
D10	17-Aug	27.31	6.96	30.6	0.43

a Point measurements (ammonia, pH, dissolved O<sub>2</sub>, temperature, and salinity) at 12 previous sample locations and east causeway breach to select four final locations for sampling



**TABLE 6-2**  
**COMPARISON OF TOTAL AMMONIA CONCENTRATIONS TO AMBIENT WATER QUALITY**  
**CRITERIA**  
(Concentrations in mg/L)

Sampling Location	Tidal Period	Sample Designation	CLP Lab Data A,B	August 1996	Chronic AWQC	March 1997	
				ESAT-Lab Data A,B		CLP Lab	Chronic AWQC
Black Point	Low Tide	BP1-L	0.05	0.1	4.1	NC	-
	High Tide	BP1-H	0.05	0.1	0.31	NC	-
Biscayne Creek	Low Tide	BC1-L	0.05	0.1	0.81	NC	-
	High Tide	BC1-H	0.05	0.1	0.53	NC	-
Biscayne Creek	Low Tide	BC1-L48	NA	0.1	0.81	NC	-
	High Tide	BC1-H48	NA	0.1	0.53	NC	-
Biscayne Creek	Low Tide	BC1-L96	NA	0.1	0.81 C	NC	-
	High Tide	BC1-H96	NA	0.1	0.53 C	NC	-
Biscayne Creek	Low Tide	BC1-L120	0.05	0.1	0.81 C	NC	-
	High Tide	BC1-H120	0.05	0.1	0.53 C	NC	-
Confluence Biscayne Bay	Low Tide	CBB1-L	0.05	0.1	0.81	NC	-
	High Tide	CBB1-H	0.05	0.1	0.53	NC	-
Mangrove Preserve	Low Tide	D4-L	1.4	1.3	11	2.01	2.9
	High Tide	D4-H	1.6	1.55	3.1	1.13	4.1
Mangrove Preserve	Low Tide	D5F-L	0.56	0.58	5.0	0.904	7.2
	High Tide	D5F-H	1.6	1.7	4.4	2.46	3.1
Mangrove Preserve	Low Tide	D5F-L96	NA	0.31	5.0 C	NC	-
	High Tide	D5F-H96	NA	1	4.4 C	NC	-
Mangrove Preserve	Low Tide	D6-L	2.3	2.15	4.4	4.83	2.9
	High Tide	D6-H	3.3	2.7	4.7	4.77	2.9
Mangrove Preserve	Low Tide	D6-L96	NA	3.9	4.4 C	NC	-
	High Tide	D6-H96	NA	3.2	4.7 C	NC	-
Dania Cut	Low Tide	DC1-L	0.06	0.1	2.0	NC	-
	High Tide	DC1-H	0.05	0.1	1.3	NC	-
East Causeway	Low Tide	ECC1-L	0.20	0.19	7.2	0.443	7.2
	High Tide	ECC1-H	0.05	0.1	0.53	0.05	1.8
West Causeway	Low Tide	WCC-L	NC	NC	--	0.993	2.9
	High Tide	WCC-H	NC	NC	--	0.05	1.2
Wetland Mitigation Area	High Tide	WMA1	1.1	0.95	0.84	NC	-

A Detected concentrations are shaded; unshaded values are detection limits.

B Concentrations greater than AWQC are indicated with boldface type.

C Temperature, pH, and salinity data were not collected at these specific sampling hours. AWQC estimated based on physical data collected at 0 hours.

D Ambient Water Quality Criteria. Temperature, pH, and salinity data used to calculate AWQC for the 1996 and 1997 sampling are presented in Appendix C, Tables C-1 and C-2, respectively.

NA=Not analyzed.

NC=Not collected.

TABLE 6-3  
 COMPARISON OF ORGANIC AND INORGANIC CONCENTRATIONS  
 IN AUGUST 1996 TO AMBIENT WATER QUALITY CRITERIA  
 MUNISPORT SITE  
 (Concentrations in ug/L)

Chemical	Frequency	Maximum Detected Concentration	Chronic AWQC A	Number of Detects > AWQC	Sampling Location with Exceedance
Volatiles:					
Chloromethane	2/17	2	NA	-	-
1,1-Dichloroethene	2/17	4	3.2 B	1	WMA-1 High Tide
Toluene	1/17	1	5,000 C	None	-
Pesticides					
Heptachlor	1/17	0.083	0.0036	1	BP-1 Low Tide
Metals					
Arsenic	1/17	13	36 D	None	-
Copper	1/17	41	2.9 E	1	BC-1 Low Tide
Iron	1/17	540	300 B	1	WMA-1 High Tide
Lead	1/17	3	8.5	None	-

A Criteria are saltwater chronic AWQC(EPA 1995), except where otherwise noted.  
 B State of Florida (1996) water quality standard.  
 C Insufficient data to develop a criteria on. Value presented by EPA (1995) is a LOEL (Lowest Observed Effect Level).  
 D Value for arsenic III.  
 E Acute AWQC used because no chronic AWQC was available.

NA= No AWQC were available for this compound.

A summary of the results from the analyses of surface water samples for the presence of purgable and extractable organic compounds, pesticides/polychlorinated byphenyls (PCBs), and inorganic constituents is provided in Table 6-3. Review of these results do not indicate the presence of other contaminants at significant levels in the Preserve other than ammonia. Although some of the chemicals detected exceeded federal or state water quality criteria, the chemicals were only detected in one or two of the samples collected from the 17 stations. In addition, two of the chemicals, heptachlor and copper, were only detected at the reference sites. The infrequent detection and comparatively low concentrations of the chemicals do not suggest that current chemical concentrations in the Mangrove Preserve pose any concern to aquatic organisms.

#### 6.2.3 Toxicity Assessment

As previously discussed, potential toxic affects were evaluated using a coastal minnow, the Inland Silverside, *Menidia beryllina*, and a single cell species of algae, *Minutocellus polymorphus*. Results from the toxicity tests are summarized in Table 6-4. No toxic effects were detected in either the fish or algae tests. Results from the fish toxicity tests indicate a survival rate ranging from 95 to 100 percent, evidence of no unacceptable toxic effects. There was no distinction in the survival of fish tested for low and high tide, as was observed during the 1989 toxicity study. Percent survival during the 1989 study ranged from 0 to 73 percent at low tide, and from 3 to 70 percent at high tide in samples collected from the Preserve. With regard to the algal toxicity test, some significantly lower fluorometric readings were detected; however, the lower readings were attributed to clumping of the cells by native micro flora. None of the lower readings were attributed to inhibition or lack of cell growth from toxic conditions in the Mangrove Preserve surface water.

#### 6.3 Conclusions

Superfund actions to date have improved the tidal circulation in the Mangrove Preserve by as much as 40 percent, and have resulted in significant improvements in water quality and a significant reduction in surface water toxicity in the Preserve. Although all of the stations monitored in the Preserve showed improved water quality, the historically most contaminated and toxic station showed the greatest improvements. Low-tide ammonia levels at station D6 decreased from 25.24 mg/l to 2.15 mg/l and 4.83 in 1996 and 1997, respectively. During the 1996 study, with the exception of the anomalous wetland mitigation area, there were no exceedances of AWQC, nor were other organic or inorganic chemicals detected in the Preserve at levels that exceeded the AWQC. With the exception of the exceedance of the AWQC for one station, the ammonia levels detected in the 1997, sampling of the Preserve were consistent with the trend documented in 1996. With regard to toxicity tests, survival rates ranged from 95 to 100 percent for the fish, and no significant adverse cell growth was observed in algae.

These results demonstrate that the tidal restoration has significantly reduced the surface water ammonia contamination in the Mangrove Preserve documented in 1989; and as a result, the toxic conditions observed in the Mangrove Preserve in 1989 are no longer present.

TABLE 6-4

Summary of the results of toxicity tests performed on Munisport water samples, August 1996.

Sample ID Minutocellus	Menidia 7-day Chronic Test		
	% Survival	Av. Weight per Fish (mg.)	Mean Cell Density (in fluorometer units)
CONTROL	90	1.91	1.95
BC1-L	100	2.22	1.25
BC1-H	100	2.11	0.73*
BP1-L	100	1.83	2.72
BP1-H	100	1.96	2.92
CBB1-L	97.5	2.15	0.08*
CBB1-H	97.5	2.00	0.42*
DC1-L	100	1.93	-2.08*
DC1-H	97.5	1.92	-1.33*
D4-L	97.5	1.89	1.45
D4-H	100	1.79	1.35
D5F-L	100	1.74	1.84
D5F-H	95	1.90	1.83
D6-L	95	1.81	1.39
D6-H	97.5	1.96	1.45
ECC1-L	100	1.90	1.00
ECC1-H	97.5	1.94	-0.77*
WMA1-H	100	1.95	1.15

\* indicates that this value is significantly different statistically from the value for the control.

## **7.0 DESCRIPTION OF NO ACTION ALTERNATIVE**

Based on the reduction in toxicity and ammonia concentrations in surface water through Superfund actions conducted to date, resulting in the accomplishment of the intent of the ROD, this amendment to the ROD will not involve any further action by EPA pursuant to CERCLA, as amended by SARA, at the Munisport Landfill Superfund Site. No institutional controls, land use restrictions, monitoring, nor five-year review requirements are necessary.

As documented in the RI and Baseline Risk Assessment, the site did not present any unacceptable risk to human health, and the 1996 study has shown that actions to date by EPA have mitigated the threat to the environment such that further response pursuant to CERCLA is not needed. Consistent with these findings, no institutional controls or land-use restrictions are necessary. Although the former ROD provided for monitoring to ensure compliance with performance criteria, no future monitoring is required pursuant to CERCLA. Former compliance monitoring was based on the premise that performance of the hydraulic barrier and natural degradation of the ammonia with time would result in a reduction of ammonia levels in the groundwater discharging to the Mangrove Preserve. However, as the 1996 reassessment showed, risks to aquatic organisms were mitigated through the tidal restoration of the Mangrove Preserve such that implementation of the hydraulic barrier pursuant to CERCLA would not be necessary. Accordingly, compliance monitoring of groundwater performance criteria as established in the former ROD would not be appropriate. With regard to the further monitoring of surface water conditions in the Mangrove Preserve, EPA believes that the database used to formulate this amendment is consistent with, and in some cases exceeds, the database used to develop the original ROD. This amendment takes into account data collected as part of the surface water monitoring prior to and after the breach of the causeway breach, as well, the 1996 reassessment, and 1997 sampling. Furthermore, this ROD amendment takes to account the wealth of data collected during the design process. This monitoring confirms the findings of the RI that ammonia is the primary concern, and in addition to the RI, shows a general decrease in the ammonia levels with time. Given the fact that this decision is based on a database at least equivalent to that the database used to support the original action, and that continued monitoring after the RI has not revealed anything to suggest that conditions may worsen in the future, EPA believes that continued surface water monitoring pursuant to CERCLA is not warranted. With regard to the need for a five-year review, in view of EPA's findings from the RI and Baseline Risk Assessment, and based on the results from the 1996 reassessment of the Preserve, there is nothing that would prevent unlimited use and unrestricted exposure at the site pursuant to CERCLA. Therefore, no five-year review of the site is needed.

While not a part of this Superfund action, landfill closure and groundwater contamination will be addressed independently of Superfund, pursuant to State and County regulations. Finally, amendment of this ROD to no further remedial action constitutes completion of construction of all Superfund-related activities.

Based on the absence of significant toxicity and the threat to the aquatic life originally documented in 1989, and a lack of any further response actions pursuant to CERCLA, EPA intends to proceed with the deletion of this site from the NPL and request termination of the Consent Decree by the United States District Court, Southern District of Florida. Tidal restoration of the altered wetlands will be addressed pursuant to the Clean Water Act through an Administrative order with EPA, in consultation with the State and County regarding the timing of the breaches.

## **8.0 EXPLANATION OF SIGNIFICANT CHANGES**

No new information was obtained during the comment period on the Proposed Plan that resulted in any significant changes to the ROD Amendment.

## **Appendix 1**

### **RECORD OF DECISION AMENDMENT RESPONSIVENESS SUMMARY**

MUNISPORT LANDFILL SITE  
NORTH MIAMI, DADE COUNTY, FLORIDA

Prepared by:  
United States Environmental Protection Agency  
Region IV, Atlanta, GA

As part of EPA's community participation process and requirements of the Comprehensive Environmental Response, Compensation, and Liability ACT, as amended, (CERCLA), and the National Contingency Plan (NCP), EPA solicited comments from the public on the May 1997, Proposed Plan for an amendment to the Record of Decision issued by EPA on July 26, 1990. Comments were solicited through a 30-day comment period, with an additional 30-day extension to the comment period. Comments were accepted up to 10 days after the end of the comment period as requested on an individual basis. As part of the public comment period, two public meetings and an informal public availability session were held to inform the public of EPA's proposed plan and to obtain comments. Transcripts were maintained at each meeting and are part of the Administrative Record.

This Responsiveness Summary addresses and responds to comments received during the public comment period as well as comments as received during the public meetings and availability session. Where multiple comments were received on the same issue, these comments have been combined into one comment and a single response provided. In some cases, comments were provided that were beyond the scope of this proposed amendment, dealing with such issues as the adequacy of the Remedial Investigation and the original remedy. Comments formerly addressed by EPA that are beyond the scope of this amendment will not be addressed in detail in this responsiveness summary. Copies of original comments and transcripts from the public meetings are included in the Administrative Record.

1. Comment: One commenter expressed concern that too little testing, if any, of the blue crabs and food fish had been conducted in the area of the Oleta River. Concern was also expressed regarding the risks calculated during the EPA Remedial Investigation (1988) (RI), that estimated an excess cancer risk of  $2.0 \times 10^{-4}$  to  $2.0 \times 10^{-5}$  that could result from the ingestion of fish from the Mangrove Preserve area.

EPA Response: Although this comment is beyond the scope of this Record of Decision (ROD) Amendment, and the issues of potential human health affects were addressed during the RI and original ROD, a brief response is provided. First, several issues must be considered in the evaluation of the estimated risk to human health associated with the consumption of fish, including their mobility and the nature and concentration of contaminants detected at the landfill. As noted in the RI, given the mobility of the fish and the low concentration of contaminants detected at the landfill that were also detected in the fish, the potential risk could not be associated with the landfill. These risks could be associated with the numerous other point and non-point discharges to the Oleta River and Biscayne Bay. In addition, these potential risks, though on the high end, are within EPA's acceptable risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .

2) Comment: Concern was expressed that although elevated levels of metals and organic compounds were detected in the Mangrove Preserve area and fish collected from the Preserve, signs were never posted warning the public of potential public health threats.

EPA Response: Although this issue was beyond the scope of the ROD amendment, a brief response is provided. Some metals and organic compounds were detected in samples collected from the Mangrove Preserve area, however, evaluation of the data did not indicate that the concentrations were significantly enough, or detected with the frequency to suggest a potential for adverse health effects. As a result, warning signs were not considered necessary.

3) Comment: A question was asked whether or not EPA had considered consultations regarding potential public health threats to Canadian citizens that reside in the Highland Village community on a part time basis.

EPA Response: Although this comment is beyond the scope of this amendment, and deals with public health issues documented in the RI and ROD, a brief response is provided. Potential threats to human health were evaluated as part of the RI, and the only potential threat to human health was associated with long-term exposures of subsurface soils to future residents. Since Highland Village residents, including part-time Canadian residents, live off-site, they would not be considered to be at risk from long-term exposure to contaminated subsurface soils. Because of the lack of potential exposure routes to Highland Village residents, and the part-time residency of Canadian citizens, any potential adverse health effects could not be linked to the Munisport Landfill.

4) Comment: Some commenters believe that there are still too many unanswered questions concerning the Munisport Landfill Superfund Site and the threat it poses to public health. EPA should, therefore, not proceed with the amendment and eventual delisting of the site from the National Priorities List (NPL).

EPA Response: The commenters offered no specifics; thus a detailed response cannot be given. EPA does disagree, however, that the studies are insufficient. Numerous studies have been conducted by EPA, the State, County, and City of North Miami since the mid-1970's at a cost of millions of dollars. A time-line of the work conducted is shown in Figure 2-2 of the ROD Amendment. Compared to most Superfund sites, a tremendous amount of information has been gathered documenting the nature and extent of contamination and potential risk to human health. The studies demonstrate that this landfill is consistent with other municipal landfills in the State of Florida operated during the same time period, and needs to be addressed pursuant to State and County regulations. There is no evidence that the Munisport Landfill was operated as a hazardous waste facility as some commenters allege.

5) Comment: Some of the commenters recommended an alternative by which EPA could end its involvement in this project, but the U.S. District Court retain jurisdiction over the project, and the community stay involved through the community participation process provided in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended.

EPA Response: EPA appreciates the desire of some members of the community to keep the US District Court involved, since the Court has formerly allowed parties without standing to the Consent Decree between the US Government and the City of North Miami to file pleadings with the Court and persuade the Court to require periodic status reports and conferences by EPA and the City of North Miami. EPA further understands that the community participation process pursuant to CERCLA is quite different from the State's and County's participation process. However, community participation does not provide a basis for continued response pursuant to Section 104 of CERCLA. EPA is authorized to respond to the release or threat of release of hazardous substances, pollutants or contaminants in order to protect human health, welfare, or the environment. Since EPA has determined that remedial actions to date have been adequate to achieve the necessary degree of environmental protection, continued response by EPA, or the State through delegation of EPA's authority, is not appropriate. In absence of a response pursuant to CERCLA, there would no longer be a need for a Consent Decree to govern



implementation of the work. Finally, the Court affirmed at the June 26, 1997, status conference that the community's desire to have the Court retain jurisdiction was not a basis for the Court's continued involvement.

6) Comment: One commenter expressed concern for the financial liability the citizens may be exposed to should the Site be deleted from the NPL. The commenter suggested that without federal oversight, the City could possibly do the wrong thing and incur considerable expense that would be passed on to the taxpayers.

EPA Response: As stated above, an environmental threat of the magnitude which would warrant Superfund action is no longer present as a result of cleanup actions taken to date. FDEP is very capable of closing out municipal landfills under State regulations. Therefore, EPA disagrees with the commenter that the site must remain under the oversight of EPA to ensure that the City does not do the wrong thing.

Furthermore, the City has secured grants from the State and County totaling approximately \$16,000,000 to provide for the proper closure of the landfill and to address the groundwater contamination. In view of the funding received from the State and County, and given the fact that the State and County, both of which have aggressive environmental programs, will be overseeing any future work, the concern that the taxpayers may incur considerable expense in the future from failures by the City in performing the work do not appear to be well founded.

7) Comment: Some of the commenters suggested that due to poor performances by the State and County at this and other Sites in the area, neither the State nor County are qualified to manage the closure of the landfill and groundwater contamination.

EPA Response: EPA strongly disagrees with this comment. The State and County both have comprehensive, aggressive, environmental programs based on regulations that are often more stringent than the Agency's own regulations. EPA is very confident that the State and County can manage any future cleanup that may be required by State or County regulations.

8) Comment: One commenter expressed concern that if other EPA amends the ROD to no action, and the site is not cleaned up, it will have a severe impact on property values.

EPA Response: EPA disagrees that a lack of response by EPA will have an additional detrimental affect on area property values. As discussed in the 1990 ROD, this site does not pose a threat to public health, and as discussed in this amendment, EPA has determined that action taken to date have been adequate to mitigate the threat to the environment such that further response pursuant to CERCLA is not warranted. Nevertheless, it is the Agency's understanding that the State and County will continue with the closure of the landfill and management of contained groundwater in accordance with State and County regulations.

9) Comment: A commenter expressed a strenuous objection to EPA's failure to invite representatives of the Keystone Point Homeowners Association (KPHA) to attend a May 28, 1997, meeting and site visits.

EPA Comment: EPA regrets that members of the KPHA were not invited to the meeting. The meeting was among EPA, DERM, FDEP, and City officials to discuss the terms of an Administrative Order pursuant to the Clean Water Act to address the tidal restoration of the altered wetlands. This meeting was coordinated by the Department of Justice (DOJ), and as the recipient of a Technical Assistance Grant, the Munisport Dump Coalition (MDC) was invited to attend the meeting. DOJ did not realize until shortly before the meeting that Maureen Harwitz, Executive Director, MDC, was out of the country. Moreover, until recently, EPA and DOJ was unaware that KPHA desired to be involved directly, independent of the MDC. EPA had assumed that as the TAG recipient, the

MDC, would have communicated any KPHA concerns.

10) Comment: Some of the commenters disagreed with EPA's assertion that the tidal restoration to the Mangrove Preserve has reduced the ammonia levels and toxicity in the Mangrove Preserve such that the Site no longer poses a significant threat to the environment. They argue that the testing criteria used in the 1996 and 1997 testing, differed from the 1989 study, and therefore do not provide a reliable comparison. The commenters argue that differences in rainfall, testing conditions, and test species do not provide a valid comparison.

EPA Response: EPA disagrees with the commenters position that the 1996 and 1997 testing do not support EPA's determination that the site no longer poses a significant threat to the environment. Significant amounts of information has been gained since the 1989 study, providing key insight into the cause of toxicity documented in 1989.

Extensive information has been collected during treatability and design studies that show that the toxicity observed in 1989 was the result of elevated levels of ammonia. Because EPA was trying in 1989 to conduct a broad characterization of the problem, EPA used a suite of test organisms and procedures to investigate toxicity in the form of mortality and inhibition in growth and reproduction. However, with information from the 1989 study and information from the more recent design and treatability studies, EPA was able to refine the 1996 study to focus on the main problem in the Preserve ...elevated levels of ammonia.

As a result, EPA refined the scope of the study to focus on the toxicity associated with the discharge of leachate-contaminated groundwater to the Preserve. The scope of the 1996 study incorporated two test organisms, both of which were used in the 1989 study and have been shown to provide a reliable indication of toxicity.

With regard to variations in climatic conditions during the study, it is true that the 1989 study was conducted during an extended dry period, while the 1996 study was conducted during a wet period. It should be noted that prior to the original ROD, some of the same commenters argued that the 1989 study under-estimated the toxicity, since the lack of rainfall resulted in a reduction in the amount of leachate normally generated. These commenters now argue that the increased rainfall would have diluted the leachate discharge, again under-estimating the problem. If you apply the same logic used by the commenters in 1989, a reduction in rainfall would have reduced the amount of leachate formed, thus, under-estimating the problem. While an increase in rainfall as observed in 1996, should have resulted in an increase in the amount of leachate formed, contrary to the commenters current position.

Nevertheless, EPA collected an additional set of surface water samples during a dry period in 1997 to evaluate whether or not the increased rainfall had diluted the problem as alleged by the commenters. The data showed no significant change in the ammonia concentration from the wet and dry sampling events in 1996 and 1997, respectively.

In summary, it was not the intent of EPA, nor for the reasons discussed above, was it necessary to exactly duplicate the 1989 study. The fact remains that EPA conducted a valid water quality and toxicity assessment of the conditions in the Mangrove Preserve in 1996, that demonstrates that the actions taken to date have been adequate to reduce the risks posed to the environment such that a response pursuant to CERCLA is no longer warranted.

11) Comment: One of the commenters stated that by amending the ROD to no action, EPA is abandoning its responsibility to stop the seepage of contaminants to Biscayne Bay and Arch Creek Canal.

EPA Response: EPA disagrees with the commenter. EPA believes that it has fulfilled its

obligation pursuant to CERCLA and has met the intent of the ROD to address the environmental threat documented in 1989. Although the ROD incorporated the collection and treatment of contaminated groundwater as part of the remedy, it was a vehicle by which EPA could stop the exposure of aquatic organisms in the Mangrove Preserve to elevated levels of ammonia being discharged from the landfill. Alternatively, had the 1989 study not documented any toxicity to aquatic organisms in the Preserve, EPA would not have implemented a remedy to collect and treat contaminated groundwater.

Since EPA's actions to date have mitigated the threat documented in 1989, there is no basis for groundwater collection and treatment pursuant to CERCLA. EPA is aware, however, that contaminants are present in the groundwater that exceed county regulations, and that DERM is pursuing with the City the implementation of a groundwater collection and treatment system to attain the county's standard. It is important to note that these standards are based on the potential for harm to occur and provide a more conservative approach than the direct measure of toxicity employed by EPA. This approach is within the prerogative of DERM to follow, but exceeds the requirements established in CERCLA.

12) Comment: In view of the delays in construction of the remedy, and now that EPA does not plan to complete construction of the remedy, a commenter restated a prior objection to EPA requiring the City of North Miami to avoid its competitive bidding process to expedite the construction process.

EPA Response: Although the comment is beyond the scope of this ROD amendment, a brief response is provided. First, the City of North Miami chose to use their emergency procurement procedures, and not use the competitive bid process, to avoid potential monetary penalties for non-compliance with EPA's approved project schedule. Second, the lapse of time since the initial construction of the recovery well system was the result of delays encountered as a result of objections to the work in the fall of 1995 by local activists, not as a result of mismanagement of the project by EPA.

13) Comment: The City of North Miami expressed support for EPA's proposed amendment. The City also noted that had the Hazard Ranking System scoring been revised and based on up to date information, taking into account the removal of municipal wells from service due to saltwater intrusion, the site would never have been placed on the National Priorities List (NPL).

EPA Response: EPA appreciates the City's position; however, as conveyed in its prior response to this issue, as a matter of EPA policy, it does not rescore sites once they have been placed on the NPL, since resources needed to rescore sites may be detracted from the main focus of site remediation, if sites were rescored every time new information was obtained. However, EPA does believe that with regard to this site, the diminished human health threat that resulted from the closing of the municipal wells is reflected in the lack of threat to human health documented in the Remedial Investigation and Baseline Risk Assessment.

14) Comment: One of the commenters argued that the 1989 ambient water quality criteria (AWQC) needed to be modified to correct for the 1996 variations in temperature, pH, and salinity to provide for a valid comparison between the two studies.

EPA Response: EPA disagrees with the commenters assertion that modification of the AWQC in the 1996 study using site-specific water quality parameters results in an invalid comparison of the two studies. The goal of the AWQC is to provide some standard for evaluation of a given set of data. Whether or not the AWQC is adjusted to the site-specific data, or vice versa, is not relevant. The important thing is that the comparison is drawn between the AWQC and water quality data for a given sampling event. As appropriate, the AWQC should be adjusted using the same water quality parameters indicative of the ambient conditions for which a given set of data

were collected. It would not be appropriate to make adjustments in the AWQC using indicators of ambient conditions of a different study conducted seven years ago.

15) Comment: Some of the commenters continue to characterize the Munisport Landfill as an hazardous waste facility. To support their position they refer to depositions and interviews of former landfill operators gained by the City of North Miami during its contribution action and EPA during its civil investigation work, respectively. One of the commenters also uses the periodic detection of chemicals during the RI to support the position that this site was operated as a hazardous waste facility. The commenter reasons that due to the occasional detection of polychlorinated biphenyls and disposal of liquids at the landfill, dioxin and dense non-aqueous phase liquids (DNAPLs) are likely present at the landfill. The commenter also raises the former issue of a Notice of Violation of Hazardous Waste Disposal issued by DERM in 1976 regarding twelve drums as further evidence of the operation of the Munisport Landfill as a hazardous waste facility.

EPA Response: EPA disagrees with the commenters' assertions that the Munisport Landfill was operated as an hazardous waste facility. EPA believes that the extensive chemical database and lack of specific documentation of routine hazardous waste disposal supports EPA's assessment that the wastes disposed of at this facility are consistent with other solid waste landfills operated in the State of Florida during the same time period.

Over the years EPA has conducted comprehensive civil investigative work and has not gained any direct evidence of hazardous waste disposal, other than the isolated incident reported by DERM in 1976. Assuming there had been some wholesale hazardous waste disposal, as alleged by the commenters, the comprehensive groundwater monitoring network of over 100 monitoring wells at the site would have given some indication of the contamination. With regard to the presence of a DNAPL, no chemicals were ever detected at the site with any consistency or at the concentrations approaching the water solubility of the compound that might suggest the presence of a DNAPL.

With regard to the commenters assertion that the detection of PCBs are indicative of a dioxin problem at the landfill, once again EPA questions the scientific basis for this reasoning. The RI only reported PCBs in three of the 25 soil samples collected from the landfill. Concentration for the PCBs reported were very low, generally an order of magnitude lower than any cleanup criteria. Clearly the infrequent detection of PCBs at very low concentrations is not a sound scientific basis for suggesting that there is even a PCB problem, much less a concern for dioxins at the site.

There is no evidence that this landfill was operated as a hazardous waste facility, or that it was operated any differently than other solid waste landfills in Florida during the same time period. Clearly this landfill did receive a large volume of solid waste, some of which had hazardous constituents, that need to be addressed through proper closure of the landfill pursuant to state law.

16) Comment: Some of the commenters suggested that the calibration of wells along the eastern hydraulic barrier during the 1996 study may have skewed the study results. They seem to suggest that the pumping of the wells created a temporary hydraulic barrier, thus reducing the amount of leachate discharging from the landfill.

EPA Response: EPA disagrees with the commenters allegations that the calibration of the wells skewed the 1996 study results. First the commenters fail to acknowledge the limited affect of the calibration test. Only one horizontal well was operated at a time, with a pumping duration of between 24 to 48 hours. Secondly, the commenters fail to note that during the August 19-27, 1996, collection of samples, the horizontal wells being calibrated were not in the vicinity of the surface water monitoring (i.e., they were south of the study area). Finally, a single well,

or several wells would not have had any instantaneous, widespread affect, which would be needed to alter the amount of leachate discharged.

The calibration of the wells could not have had any significant impact on the surface water monitoring. Had EPA been concerned that it would have caused a problem, we would have easily rescheduled the calibration monitoring. EPA finds it difficult to follow the logic of the commentors arguments, since on the one hand they have argued that the long-term operation of the barrier will not be effective in capturing the leachate from the landfill, while on the other hand, they argue that the pumping of a well operated for a couple of days could affect the amount of leachate discharged.

EPA's assessment of the lack of impact of the calibration test is further substantiated by the results from the 1997 sampling. Had the calibration test affected the leachate discharge as alleged by the commenters, there should have been a significant increase in the concentrations of ammonia reported in the 1997 sampling. The 1997 levels, however, were consistent with those observed in 1996.

17) Comment: A commenter questioned why metal analyses were not conducted in the 1996 study.

EPA Response: Analyses for metals were conducted in accordance with the EPA Contract Laboratory Program Target Analyte List for an 17 surface water samples collected during the 1996 study. The results are summarized in Table 5-5 of the Water Quality and Toxicity Reassessment Study (1997). The commenter may have overlooked the results due to the small number of metals detected.

18) Comment: A commenter questioned why EPA had not attempted to disavow any of its findings in the 1994 Explanation of Significant Differences changing the treatment from air stripping to the Publicly Owned Treatment Works (POTW). The commenter noted that the basis for the change in treatment was based on the lack of effectiveness in the removal of ammonia.

EPA Response: After the ESD, and as the pumping rates needed to implement the hydraulic barrier were refined during the design process, it became apparent that the pumping rate needed to implement the barrier would exceed the capacity formerly allotted by the POTW. The estimated cost associated with treatment of the waste at the POTW was significantly higher than originally projected. Therefore, the City, in consultation with EPA, FDEP, and DERM, decided to pursue other, more cost-effective, on-site treatment options.

Treatability studies using biological processes demonstrated that the ammonia and associated toxicity could be effectively removed from the contaminated groundwater. These results are summarized in the Draft Design Report, Munisport Landfill Superfund Site, SECOR International, 1996, Appendix A. If the 1996 reassessment of the Mangrove Preserve had not shown that no further action was warranted pursuant to CERCLA, the next step after the completion of the bioremediation treatability studies would have been to proceed with a second ESD changing the treatment from POTW to biological.

19) Comment: A commenter states that EPA does not and cannot assert that groundwater discharging from the landfill is not currently in violation of State regulations for Outstanding Florida Water.

EPA Response: EPA has never suggested that the water quality underlying the landfill does not comply with State and County standards. The original ROD was issued solely to address the environmental threat posed by the toxicity to aquatic organisms documented in the Mangrove Preserve in 1989. EPA's action was not taken in an effort to remediate the groundwater, but was taken solely to abate the threat to aquatic organisms caused by the toxic conditions in the Mangrove Preserve.

Furthermore, it is important to remember that due to the closing of municipal supply wells, the City petitioned EPA to delete the site from the NPL. EPA cited its policy of not rescoring sites after they are finalized on the NPL, but agreed to conduct an RI and risk assessment of the site, and if the site did not pose any threat to human health or the environment, it would be deleted from the NPL. Therefore, had a toxicity problem not been documented in 1989, EPA would not have likely taken an action in absence of an environmental or human health threat.

20) Comment: A commenter stated that the 1996 and 1997 studies are wholly inadequate to support the amendment to the ROD to no further action. The commenter further argues that the amendment would have the effect of deleting the site from the NPL, eliminating the oversight by the United States District Court. The commenter also questions the appropriateness of the EPA's amendment of the ROD in light of the significant work already conducted with regard to the installation of the groundwater recovery system.

EPA Comment: EPA disagrees with the commenters general assertions that the studies have been inadequate to support EPA's for no further action under Superfund. With regard to the lack of future oversight by the United States District Court, the Court's future is not a criterion used by EPA in deciding whether or not to amend RODs nor to make any technical decision. The court even noted that the June 26, 1997 status conference that the community's desire alone, is not enough to keep the Court involved, should EPA decide that no further response under Superfund is warranted. Finally, the degree of construction of the hydraulic barrier was not a consideration in the amendment of the ROD. The ROD was amended solely based on the compelling information that shows that the remedial actions to date have been adequate to abate the threat to the environment such that no further action under Superfund is warranted.

21) Comment: Some of the commenters argued that EPA had not completed all of the components of the ROD nor had it attained the cleanup goals specified therein.

EPA Response: As EPA explain in its Proposed Plan, and stated during the public meetings, it was not the intent of EPA's action to determine that all of the components of the remedy were completed nor that all of the cleanup criteria had been attained. Rather, it was the Agency's determination that the threat to the environment documented in 1989 had been abated through the implementation of the tidal restoration to the Mangrove Preserve, thus meeting the intent of the 1990 ROD. Since the intent of the action was achieved through the tidal restoration, it was no longer necessary to implement the balance of the cleanup criteria pursuant to CERCLA.

It is important to note, however, that groundwater contamination remains at the site, primarily from ammonia levels that exceed Dade County water quality criteria. These criteria were promulgated by the County and are more stringent than the requirements of CERCLA. Therefore, DERM has advised EPA, the State, City, and public that it intends to enforce its standards and require the City to adopt the same groundwater containment system to minimize off-site discharges of contaminated groundwater at levels in excess of the County's water quality standards.

22) Comment: A commenter questioned why EPA had not structured the Proposed Plan to include a proposal of no action and the selected remedy in the 1990 ROD, and evaluate the two options in accordance with the nine criteria (i.e., overall protection, compliance with ARARs, long-term effectiveness and permanence, reduction in toxicity, mobility or volume, short-term effectiveness, implementability, cost, state acceptance, and community acceptance) established pursuant to 40 CFR 300.430(e).

EPA Response: As noted in other responses, the fundamental basis for EPA's decision is that actions to date have remedied the problem such that further responses pursuant to CERCLA are no longer needed. Had the actions only partially abated the threat such that additional response

pursuant CERCLA was needed, and EPA had proposed to continue with a CERCLA response different from the original action, the commenter would have been correct in noting that an evaluation of any new alternatives with the old alternative would have been necessary. However, in absence of the need for any further action under CERCLA, there is no alternative for comparison as established in EPA guidance for developing No Action Proposed Plans and RODs (See Interim Final Guidance on Preparing Superfund Decision Documents, June 1989, OSWER Directive 93553.02).

23) Comment: One of the commenters suggested that EPA had attempted to replace its remedy with landfill closure, but had not demonstrated to the public how the closure will satisfy the requirements of the ROD.

EPA Comment: It was never the intent of the EPA to suggest in the Proposed Plan that the landfill closure would satisfy the requirements of the ROD. EPA's determination of no further action was made independent of, and was not contingent on, any actions that the State or County may require in the future. Information about possible future actions was included in the Proposed Plan and the ROD Amendment, and was discussed at the public meetings and the recent status conference for informational purposes only. EPA, in consultation with the State and County, thought this information may help to alleviate concerns of interested parties that felt that additional actions, beyond the requirements of CERCLA were still needed at the site.

24) Comment: One of the commenters questions why, after requiring the City to implement so much of the remedy required in the 1990 ROD, EPA is trying so hard to justify calling the partial remedial action a successful cleanup. The commenter offers technical difficulties and high costs in implementing the remedy as possible explanations for EPA not following through with the original remedy.

EPA Response: The commenter raised an interesting issue. EPA does not believe that partial construction of the remedy (e.g., causeway breach, hydraulic barrier, and service road) is proper justification for implementing the balance of the remedy. The only reason for EPA to continue with the implementation of the remedy would be if it was necessary to protect the environment pursuant to the requirements of CERCLA, which is no longer the case. The commenter seems to suggest that in spite of the fact that there are statutory and regulator limitations that would prohibit EPA from continuing to take an action in this case, EPA should proceed with the work since it has already been started. Most certainly, any party responsible for paying for the cost would object to this logic, since the bulk of the cost would be incurred not with construction, but long-term operation and maintenance. Since local governments and the State of Florida are bearing the financial responsibility of the cleanup, it is likely that the taxpayers of the State of Florida would object to the concept.

Furthermore, the record shows that the basis for the inclusion of the site on the NPL (i.e., closure of municipal wells due to saltwater intrusion) changed after the site was placed on the NPL. Had EPA agreed to reevaluate the site using the new information, it would not have scored high enough to remain on the NPL. Assessment of the potential threat posed by the site during RI identified no threat to human health, and only a marginal threat to the environment. A further assessment of the potential threat during the Mangrove study did not indicate a threat to the environment. EPA questioned at the time whether or not the tidal restoration of the Mangrove Preserve would have been adequate to mitigate the threat. However, in view of the community's and some regulatory agency's objection to the no action alternative proposed in 1988, EPA felt that it must proceed with a more proactive and comprehensive remedial alternative provided in the 1990 ROD.

25) Comment: One of the commenters argued that the selected remedy in the original ROD was flawed. Specifically, the commenter felt that the containment strategy was flawed, and should have adopted an approach that included 1) removal of 20% of the buried waste, 2) capping of the

landfill with a low permeability cover, and 3) collection and treatment of contaminated groundwater in the saltwater portion of the aquifer.

EPA Response: The selected remedy in the original ROD was not the subject of review during the comment period for the proposed ROD amendment. These and other issues were addressed during the comment period for the original ROD. Nevertheless, a brief response to the commenters approach is provided.

and disposal of 20% (i.e., hot spots) of the solid waste, there are no disposal records, nor does the information from the numerous investigations show that waste were disposed of in discrete areas that could be identified and excavated. EPA does not subscribe to the theory that borrow pits that were backfilled with solid waste, or that monitoring wells with elevated levels of ammonia, provide sufficient information to even identify a "hot spot", much less define a discrete area for excavation. Secondly, in the unlikely event that discrete areas of contamination could be identified, based on the opposition received from the community during the clearing of vegetation during the construction of the road, it is doubtful that the community would support the excavation of 1.2 million cubic yards (i.e., 20% of landfill volume) of garbage. Excavation of this volume of garbage would involve the loading and hauling of garbage using approximately 60,000 trucks, and take approximately 4 years to complete. The excavation would also raise other logistical problems such as the control of odors, transportation through congested areas, and the identification of an acceptable disposal location. In addition to logistical problems, the issue of cost would have to be addressed. The cost for excavation and disposal of 1.2 million, could easily exceed \$100,000,000, and as noted earlier, the local and state governments (i.e., the taxpayers) would ultimately bear the cost of the cleanup. Finally, there is no evidence to suggest that this approach would achieve a higher degree of protection than a containment approach, certainly not in view of the financial hardship and other burdens it would place on the community.

The issue of whether or not to use a permeable or impermeable cover has been debated over the past several years. As the commenter noted, there are advantages and disadvantages with either approach. However, the selected remedy in the ROD was developed using the premise that the landfill would be closed using a permeable cover, an approach endorsed by the Technical Advisory Committee. Nevertheless, regardless of EPA's or the commenter's views on the appropriate landfill cover, this is a landfill closure issue that will ultimately be decided through the State's landfill closure process

With regard to the issue of the collection and treatment of deep groundwater contamination at the base of the aquifer, results from the RI and other design studies clearly show a decline in the contaminants below the transition from the freshwater to saltwater portion of the aquifer. The degradation of the base of the aquifer by saltwater has rendered the water unsuitable for potable purposes. Hydraulic influences of the ocean would limit the environmental impact that low levels of contaminants could potentially have on the Bay, as well as the effectiveness of a groundwater recovery and treatment system in the lower saltwater portion of the aquifer.

26)Comment: A commenter questioned whether or not EPA had considered the impact of the landfill on the Biscayne Bay by not addressing the deeper groundwater contamination and DNAPLs, and not requiring the operation of the hydraulic barrier system.

EPA Response: EPA disagrees with the commenters premise that there is a deep groundwater contamination or DNAPL problem, or that contaminants that migrate to the deep portion of the aquifer would pose a threat to Biscayne Bay. As explained in other responses, the RI report and other design studies show that the contamination is primarily limited to the upper, freshwater portion of the aquifer. Results from the RI and design studies also show a distinct freshwater-saltwater mixing zone, beneath which is saltwater as a result from the migration of



water from the ocean. Due to the hydraulic influence of the ocean and inland encroachment of saltwater, low levels of contaminants that migrate into the deeper saltwater portion of the aquifer would not be expected to discharge in significant quantities in the Bay.

In contrast to the saltwater zone, the RI and design studies have defined a freshwater gradient towards the east, southeast, and south, discharging into the Mangrove Preserve and Bay. Years ago when there were higher levels of water in the aquifer, direct discharges of freshwater in the form of springs had been documented. However, with the increased demands placed on the aquifer from increases in population and agriculture in south Florida, freshwater reserves have been reduced, resulting in saltwater intrusion and in a decrease in the direct discharge of freshwater to Biscayne Bay. This change in the aquifer is evident by the closing of local municipal wellfields near the coast, and a long-range plan by the South Florida Water Management District to relocate other municipal wellfields further inland.

Therefore, EPA's original remedy was designed to address the migration of leachate from the landfill into the freshwater portion of the aquifer, and discharging into the Mangrove Preserve. The remedy was also designed to indirectly address the migration of contaminants into the Bay, through controlling the discharge of groundwater to surface water of the Preserve that is tidally connected with the Bay. As noted, however, in previous responses, the threat posed by the discharge of leachate-contaminated groundwater to the Preserve has been mitigated through the increased tidal flow in the Preserve such that an additional response pursuant to CERCLA is no longer warranted.

With regard to the commenter's allegation of DNAPLs at the base of the aquifer, EPA explained in previous responses that there is no indication of the presence of DNAPLs.

27) Comment: A commenter questioned whether or not ammonia was the sole cause of the toxicity. In support of his position, the commenter cited references from studies and observations from reports by EPA and other agencies in the 1980's. The commenter also referred to EPA's change in the treatment approach from air stripping to off-site treatment as evidence of other toxicants.

EPA Response: It is true that early in this project EPA questioned whether or not all of the toxicity observed in the 1989 Mangrove preserve study was attributable to ammonia. However, as part of the remedial design process, EPA conducted several treatability studies that evaluated the effectiveness of various treatment approaches that eventually demonstrated that ammonia was the cause of the toxicity ... not some "unknown toxicant." The treatability studies involved both bench and pilot-scale studies and involved full chemical analyses and toxicity tests. Initial tests were based on the premise that ammonia levels would need to be reduced to approximately 4 mg/l to remove the toxicity.

A bench-scale test was conducted to evaluate the effectiveness of air stripping in the removal of ammonia. Air stripping was effective in removal of ammonia down to the 4 mg/l, however, not all of the toxicity was removed. Although EPA used this information to change the remedy from air stripping to off-site treatment and disposal at a local POTW, concerns about high treatment volumes and costs prompted EPA and the City to conduct additional treatability studies to evaluate other potentially viable alternatives.

To further evaluate treatment alternatives that would remove the toxicity, EPA and the City conducted a series of treatability studies in 1995 and 1996 to evaluate the effectiveness of biological processes in the treatment of the ammonia contaminated groundwater. Although there were varying degrees in the effectiveness of the ammonia removal among the vendors used, the successful vendors were able to reduce the ammonia level to below 1 mg/l. No toxicity was reported below 1 mg/l. This result, coupled with the fact that chemical analyses of the samples revealed no other contaminants in the samples at levels which could cause any toxicity led EPA

to the conclusion that elevated levels of ammonia were the cause of the toxicity. Since the commenter did not reference the 1995 and 1996 treatability studies in his comments, it is possible that he was unaware of the recent tests. The test results are presented in the Bioremediation Treatability Verification Status Report Update, Munisport Landfill Superfund Site, SECOR International, Inc., September 1996, and included in the Administrative Record for this site.

28) Comment: A commenter questioned the reliability of the RI and whether or not EPA had followed its guidance for investigating CERCLA municipal landfills. The commenter primarily refers to comments from the Florida Health and Rehabilitative Services (FHRS) regarding the recommendation for additional characterization of the contents of the landfill. The commenter also suggested that EPA had not followed its own guidance of conducting investigations at landfills when "hot spots" are known or suspected.

EPA Response: EPA disagrees with the commenter, and has publically stated its disagreement with the recommendations of FHRS that the contents of the landfill be characterized. EPA explained that given the large volume (i.e., 6,000,000 cubic yards) of solid waste, and since there was no evidence of discrete hazardous waste disposal, EPA employed a containment approach. Consistent with EPA's guidance, there was no need to characterize the contents of the landfill unless an area or areas of manageable size (i.e., less than 100,000 cubic yards) could be located and delineated for management apart from the landfill.

Unfortunately, only antic dotal information and generic disposal records exist regarding the disposal of waste at the landfill. Although there was an opportunity for the disposal of hazardous waste at the landfill, the extensive groundwater monitoring well network of over 100 wells has not suggested the presence of discreet disposal areas. EPA was, therefore, correct in the RI and original ROD for not attempting to characterize the landfill and adopting a containment approach, respectively.

29) Comment: A commenter suggested that EPA had incorrectly arrived at the conclusion that the landfill did not pose a threat to public health. The commenter cited statements from the Florida Department of Natural Resources that the ammonia plume reported in the RI showed that there was discharge to Biscayne Bay that would affect the aquatic life in the Bay and health of recreational users of the Oleta River Recreation Area. The commenter also voiced concern that there are other contaminants at the landfill, other than ammonia, such as PCBs, that could pose a threat to human health and the environment.

EPA Response: EPA disagrees with the commenters assertion that there are other contaminants present at the landfill that would pose a threat to human health or the environment. The commenter refers to the frequent detection of PCBs in the surface soil as evidence of the presence of other contaminants that could cause a threat. As noted earlier, there is no evidence that there is a PCB problem. PCBs were only detected at low-levels in three of the 25 soil samples collected from the landfill. PCBs were not detected in any of the groundwater or sediment samples which would have been a reliable indicator of whether or not PCBs, or other contaminants, were present and migrating from the landfill. Although PCBs were detected in fish tissue samples collected from the periphery of the landfill and Mangrove Preserve, comparable levels of PCBs were also detected in the background samples as well. Given the lack of significant PCB contamination at the landfill, the detection of PCBs in background samples, EPA concluded that PCB contamination detected in the fish was not related to the landfill, but other point and non-point discharges to the BAY.

Another example of problems in Biscayne Bay that was incorrectly associated with Munisport by critics of EPA's assessment of the site was a problem of elevated levels of fecal coliform detected in the northern point of Biscayne Bay, that resulted in the temporary closing of the

Oleta River State Park to swimming. The critics first assumed that the landfill was the source of the contamination, in spite of the fact that coliform bacteria would not have survived for a significant length of time without an ongoing or renewed source, which was not the case with Munisport since the dumping of solid waste ceased years ago. Samples were even collected from the periphery of the landfill to help show that the landfill was not the source of the fecal coliform contamination. It was not until a break in a sewage main crossing the Oleta River was discovered that the critics were convinced that the landfill was not the source of the fecal coliform contamination.

This is just one example of the discharge of contaminants to Biscayne Bay from sources other than the Munisport Landfill.

30)Comment: A commenter suggested EPA had somehow limited or controlled the National Oceanic and Atmospheric Administration's (NOAA) (the marine natural resource trustee for this site) review of the proposed amendment of the ROD to no further action. The commenter noted that NOAA had formerly opposed EPA's plan of no action, and implies that NOAA must have been influenced by EPA in not objecting to the amendment of the ROD.

EPA Comment: EPA objects to the commenter's allegation that EPA somehow influenced NOAA's position. Moreover, these comments are not related to any technical issues. One must ask that if EPA had the ability to influence NOAA's assessment of the site, it would have been exercised with the 1988 proposal of no action. NOAA's opposition to the proposal shows that its decisions are formulated independently of EPA's influence, and reflect what NOAA believed was best for its trust resources at the time.

The commenter fails to note that NOAA has properly taken into account the additional information that has been collected since the completion of the RI and the affect of the tidal restoration on the Mangrove Preserve in formulating its current assessment site. With regard to the reassessment of the Mangrove Preserve, NOAA was involved in the formulation of the sampling strategy as well as participating in the field work. Clearly, NOAA was intimately involved in the reassessment of the water quality and toxicity conditions in the Mangrove Preserve. NOAA was also part of the peer review of the report, draft Proposed Plan, and draft ROD Amendment. NOAA provided some minor comments on the report, and verbal conveyance of concurrence with the plan. After review of the Proposed Plan and draft ROD amendment, NOAA provided formal concurrence with the ROD Amendment on August 11, 1997. NOAA's comments will be included in the Administrative Record for the Site.